UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,276	11/14/2003	John M. Morgenstern	SAI.P011 US	2041

32794 7590 07/26/2007
KOESTNER BERTANI LLP
2192 Martin St.
Suite 150
Irvine, CA 92612

EXAMINER
DINH, TIEN QUANG

ART UNIT	PAPER NUMBER
3644	

MAIL DATE	DELIVERY MODE
07/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

MAILED

JUL 2 6 2007

GROUP 3600

Application Number: 10/714,276
Filing Date: November 14, 2003
Appellant(s): MORGENSTERN ET AL.

Mary Jo Bertani
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 4/9/07 appealing from the Office action mailed 6/30/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Darden, Christine M., "Sonic Boom Minimization With Nose-Bluntness Relaxation:, NASA Technical Paper 1349, (NASA 1979) pp. 1-51.

Makino et al., "Non-Axisymmetrical Fuselage Shape Modification For Drag Reduction of Low Sonic-Boom Airplane", AIAA 2003-557, January 6, 2003.

Howe, Donald, "Sonic Boom Reduction Through the Use of Non-Axsymmetric Configuration Shaping", AIAA 2003-929, January 6, 2003.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-12, 29-39 are rejected under 35 U.S.C. 103(a) as obvious over Darden in view of Makino or Howe.

Darden teaches design steps taken to configure the aircraft for low sonic boom supersonic flight conditions by an equivalent area distribution curve of the aircraft to approximate an ideal equivalent area distribution goal. The ideal equivalent area distribution goal curve is what one skilled in the art would want so that would motivate one skilled in the art to achieve that. Although Darden doesn't seem to specifically mention about "relaxing a design constraint", one

skilled in the art would have "relaxed the design constraint" as desired to design an optimally performing aircraft. Please note that Darden teaches segmenting the wing into panels to analyze them and thus smoothing the configuration of each panel, determining the design variables along the Mach angle lines, determine an angle incident angle and shape of the remain portions for maximum lift-to-drag ratio. Darden also discloses using F-function to determine the minimized sonic boom disturbance and scaling the equivalent area distribution goal curve to maintain the desired aircraft weight. Darden also inherently teaches redistributing the areas of lift subject to center of pressure constraints to achieve the desired balance characteristics. Furthermore, Darden teaches that redistributing the lift of the wing by having the far-field expansion ahead of the areas of far-field compression and scaling an equivalent area distribution goal curve to maintain the desired aircraft weight that counter excursions below the equivalent area distribution goal curve.

Darden seems to be silent on the design steps as it relates to the sonic boom on the wings. However, Makino or Howe discloses that the design of the fuselage of the aircraft and the wings as an integrated system to reduce sonic booms are well known in the art.

It would have been obvious to one skilled in the art at the time the invention was made to have expanded the steps of Darden to analyze and design the whole aircraft (not just the nose) as taught by Makino or Howe to allow the design of the whole aircraft.

Re claims 5 and 33, to re-determine the incidence angle and remaining portion is an inherent step that one skilled in the art would have taken to design an optimal operating aircraft.

Re claims 6, 7, and 35 to optimize the configuration is a step that one skilled in the art would have taken to improve the design of the aircraft.

Re claims 10 and 38 to analyze the sonic boom below and to the side of the aircraft and to perturb the aircraft design variables are steps that one skilled in the art would have used in designing the whole aircraft.

Re claim 11, adjusting and reshaping are steps that one skilled in the art would have taken to improve the design of the aircraft.

Re claim 39, please note that allow a use to define a design variable is an inherent step one skilled in the art would have taken to optimize the design of the aircraft.

(10) Response to Argument

The examiner would like to firstly point out that even though Darden talks about the bluntness of the nose, the examiner believes that Darden also talks about the aircraft as a whole with a great amount of emphasis of the nose design taken into account. Darden's mathematical terms such as airplane weight (WG) airplane altitude, airplane length (L), etc. as shown on page 2 of Darden are used to compute the fluid flow around the whole aircraft (using Computation Fluid Dynamics, discussed in detail below) and not just the nose. The examiner believes that Darden discussed designing the whole aircraft but given greater weight to talking about the nose. That is why the examiner believed that Darden teaches segmenting the wings in the rejection. Nevertheless, Markino or Howe was used to teach that using CFD to design the whole aircraft is well known in the art.

The examiner respectfully disagrees with the applicant's arguments that Darden in view of Makino or Howe does not teach what has been claimed. Claim 1 called for the scaling the equivalent area distribution curve of the aircraft and relaxing the design constraint of the

distribution curve to be at or below the equivalent area distribution goal curve. The Examiner noted that in the "Summary" on page 2 of Darden, the scaling of the equivalent area distribution curve of the nose and relaxing the design constraint is also discussed. The "Introduction" on the same page also teaches relaxing nose design constraint on the 3rd paragraph. The computer program is used to analyze the design and various parameters of airflow around the nose of the aircraft. See last paragraph of the introduction. Cleary, Darden teaches the use of aerodynamics or fluid flows equations to compute the interaction of the fluids around the aircraft nose. This is also known as computational fluid dynamics (CFD). The various experimental designs that an aerodynamic engineer would have used will be computed, analyzed, and determined in terms of cost versus benefits to find the optimal design for the nose. These are steps that engineers have used for decades. Makino or Howe was introduced to show that using the claimed methods to apply to designing the whole aircraft is well known. As a matter of fact, Makino's "Introduction", it is discussed that the Darden's reference to the nose is well known but method that is used to design the fuselage. Makino's abstract also discussed using CFD to analyze and design the super sonic aircraft as a whole, which includes the wings, tail, etc. Howe disclosed the use of CFD and the design process of using distribution curve to optimize the whole aircraft. Howe, also, discussed the use of designing the aircraft/body also on page 5. Hence, Makino and Howe discussed that design the aircraft as a whole and not just a single part such as the nose are well known in the art.

One skilled in the art would have applied the claimed process to design the whole aircraft since the whole aircraft is going to fly and not simply the nose. In a recent Supreme Court ruling (KSR Int'l Co. v. Teleflex Inc. 127 S.Ct. 1727, 1731, 82 USPQ2d 1385, 1389 (2007), that

When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, 35 USC 103 likely bars its patentability.

Re claim 29, please note that when Darden in view of Makino or Howe are viewed as teachings, the design of the whole aircraft must be taken into considerations. This includes the wings. "Redistributing lift of a wing by configuring the wing with areas of far-field expansion..." is a design step that one skilled in the art would have taken to optimize the flow around the wings.

Re claims 2 and 30, when Darden in view of Makino or Howe are taken into account, segmenting the wing into panels are taught since Makino or Howe teaches that CFD is used to design the aircraft. CFD is defined as ...

Computational fluid dynamics (CFD) is one of the branches of fluid mechanics that uses numerical methods and algorithms to solve and analyze problems that involve fluid flows. Computers are used to perform the millions of calculations required to simulate the interaction of fluids and gases with the complex surfaces used in engineering. However, even with simplified equations and high-speed supercomputers, only approximate solutions can be achieved in many cases. More accurate software that can accurately and quickly simulate even complex scenarios such as transonic or turbulent flows are an ongoing area of research. Validation of such software is often performed using a wind tunnel.

Furthermore,

The most fundamental consideration in CFD is how one treats a continuous fluid in a discretized fashion on a computer. One method is to discretize the spatial domain into small cells to form a volume mesh or grid, and then apply a suitable algorithm to solve the equations of motion (Euler equations for inviscid, and Navier-Stokes equations for viscous flow). In addition, such a mesh can be either irregular (for instance consisting of triangles in 2D, or pyramidal solids in 3D) or regular; the distinguishing characteristic of the former is that each cell must be stored separately in memory. Where shocks or discontinuities are present, high resolution schemes such as Total Variation Diminishing, Flux Corrected Transport, Essentially NonOscillatory, or MUSCL schemes are needed to avoid spurious oscillations in the solution.

Notice that CFD is calculations of fluid flows in "small cells to form volume mesh or grid." This is the panels as claimed. Once the flow is analazyed, clearly the best configuration is chosen to optimized the aircraft.

Re claim 3, this is the basic design equation of CFD to determine flow around the desired part.
Re claims 4, 5, and , please note that when designing, these are steps that one skilled in the art would have taken to clearly optimize the fluid flow around the wing by using CFD analysis.
Re claims 9 and 37, Darden discussed that F-fuctions are well know to analyze flow around an aicraft parts.
Re claim 6, 19, 10, 11, 12, 31-36, 38, and 39, these are design steps that one skilled in the field of advance aerodynamics would have used since after analyzing the flows around certain designs

using CFD, one skilled in the art would have redesigned the aircrafts with various changes in parts so as to optimize the aircraft for supersonic flight.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Tien Dinh

Conferees:

Teri Luu

Meredith Petravick